

APPENDIX S

Field and Laboratory Operations

FIELD AND LABORATORY OPERATIONS

Sample Collection

Sample collections were obtained using a Smith-Root Model VII and Model XIA Portable Electrofishers; a Smith-Root SR-16E electrofishing boat; variable mesh, woven, and monofilament gill nets; baited hoop nets measuring three feet in diameter with one inch square mesh; or beach seines of varying lengths, widths, and material. Collected fish were kept in clean stainless steel buckets until they could be double-wrapped in extra-heavy duty aluminum foil (dull side inward), labeled, and packed in dry ice where they were frozen.

Laboratory Analysis

A detailed description of procedures and techniques discussed below can be found in the Department of Fish and Game's (DFG) Laboratory Quality Assurance Program Plan (DFG 1990). The following is a summary of the 1994-95 Quality Assurance/Quality Control (QA/QC) results provided by the DFG's Water Pollution Control Laboratory. Copies of the Laboratory Quality Assurance Program Plan and QA/QC results are available upon request.

Trace Elements Analytical Techniques in Tissues

A Varian Model Spectra 300 atomic absorption spectrophotometer was used for techniques employing conventional (flame) atomic absorption spectrophotometry (copper and zinc). A Varian Model VGA-76 Hydride Generator was used for hydride generation atomic absorption spectrophotometry (arsenic and selenium), and cold vapor technique for mercury (Adrian 1971; Uthe et al. 1974; and Evans et al. 1986). A Perkin-Elmer Model 3030 Zeeman atomic absorption spectrophotometer equipped with a HGA-600 graphite furnace and an AS-60 autosampler was used for techniques requiring a graphite furnace (cadmium, chromium, nickel, lead, and silver). All analytical values were corrected using procedural blanks. Trace element analytical and digestion techniques along with their detection limits are presented in Table S-1. All digestion techniques, except for mercury, are the same as those used since 1988.

Samples were weighed into pre-cleaned 200mm x 25mm glass tubes which had been checked for trace element contamination. Digestion of the sample was accomplished by adding concentrated nitric acid and heating the tube in an aluminum block to reflux the acid. The acid was allowed to reflux until the evolution of NO_x (brown fumes) was no longer apparent (about 2 hours). The block temperature was increased to reduce the volume in the tube by evaporation. When the volume in the tube reached about 0.5 ml the tube was removed and allowed to cool. The digestate was diluted to 40.0 ml with 1% nitric acid solution. The digestate was mixed on a vortex mixer and transferred to a clean polyethylene bottle.

In addition to routine trace element analyses, 10 percent of the samples were analyzed in duplicate to determine precision. The results of duplicate laboratory sample analyses are presented in Table S-2. To protect sample integrity, all materials contacting samples during laboratory operations were analyzed for trace element content. To ensure accuracy, reference materials from the National Institute of Standards and Technology (NIST) and the National Research Council of Canada were analyzed (Table S-3).

Synthetic Organic Compounds Analytical Techniques in Tissues

A 10 gram sample of the flesh-water (1:1) paste was spiked with a mixture of 4,4'dibromo-octafluorobiphenyl, decachlorobiphenyl and dibutylchloroendate (DBOB, DCB, and DBCE) and extracted twice with acetonitrile by shaking for two minutes. The decachlorobiphenyl (DCB) was used as an internal standard to determine relative retention times and as a surrogate to determine analyte recovery of the Florisil[®] F1 compounds. DBOB was used to check the analyte recovery of the F2 compounds but was found to elute with the F1 compounds. DBCE was used to check the analyte recovery of the F3 compounds. The sample extracts were combined, filtered, and partitioned with petroleum ether. An aliquot of the petroleum ether extract was eluted through a Florisil[®] column. The Florisil[®] columns were eluted with petroleum ether (Fraction 1), six percent ethyl ether (Fraction 2), and 15 percent ethyl ether (Fraction 3). Fractions 2 and 3 were spiked with DCB and all of the fractions were concentrated to an appropriate volume in a Zymark[®] Turbovap concentrator prior to analysis by gas chromatography. The DCB was used as an internal standard to determine relative retention times and gas chromatograph operation. A mixture of synthetic standards was eluted through the Florisil[®] column to determine the recovery and separation characteristics of the column. The distribution of synthetic organic compounds in the fractions are listed in Table S-4.

At stations where the TSMP had previously detected endosulfan, samples were analyzed for endosulfan I, endosulfan II, and endosulfan sulfate. This required an additional elution through Florisil[®] with 50 percent ethyl ether in petroleum ether (Fraction 4, Table S-4). All other stations were initially analyzed for endosulfan I only. This fraction was also spiked with DCB prior to the concentration step. Due to the high lipid content of the fraction all of the 50 percent extracts were diluted with iso-octane by a factor of ten prior to analysis by gas chromatography. The detection levels for synthetic organics in flesh are presented in Table S-5.

In 1994, a solution containing known concentrations of target analytes was added to a fish sample to assess accuracy and matrix effects. In 1995, a matrix spike and matrix spike duplicate were analyzed. Percent recoveries of the target analytes are listed in Table S-6.

Ten percent of the samples were analyzed in duplicate (Table S-7). All materials and solutions contacting the sample were analyzed for organic contamination. To preclude errors due to contamination, a vertical solvent blank analyzed for each set of glassware before introducing a new sample.

Synthetic Organic Compounds Analytical Techniques in Sediment

The sediment sample was spiked with the DBOB, DCB and DBCE solution. After adding approximately 200 ml of a 1:1 solution of acetone in dichloromethane, the sample was placed on a Lab-Line Orbit Shaker and shaken for two hours at 400 rpm. This step was repeated after the sample was filtered. After evaporating and exchanging solvents, the sample extract was eluted through a Florisil[®] column as was done with tissue samples.

Synthetic organic compound concentrations in sediments are reported on a dry weight basis. The moisture content of sediments can widely vary. The detection limit is dependent on sample size, therefore, the detection limit varies with moisture content. Table S-8 lists the detection limits for the sediment sample analyzed in 1994. Sediments were not analyzed in 1995.

Instrument and Analytical Conditions for Chlorinated Hydrocarbons

Chlorinated hydrocarbons were determined with a Varian Model 3500 gas chromatograph equipped with a model 8035 autosampler, temperature programmable on-column injector, and dual Ni⁶³ electron capture detectors. A 5 meter J&W DB5 fused silica capillary pre-column is connected to the temperature programmable injector, the column effluent is split using a press-fit "Y" connector to a 60 meter J&W DB5 and a 60 meter J&W DB17 column. The DB5 and DB17 columns are connected to the electron capture detectors. All three columns have a 0.25 mm ID and a 25 um liquid phase thickness. Helium was used as the carrier gas at a linear velocity of 35 cm/sec and nitrogen was used as the detector makeup gas at a flow of 25 ml/min. Chromatographic data were acquired and processed with a Hewlett-Packard Chem-Station, version A.03.02.

All samples were analyzed using a single injection for each extract under the following conditions:

Injector temperature program:	Initial temperature - 70 °C Program rate - 300 °C/min Final temperature - 280°C Final temperature hold time - 70 min
Column temperature program:	Initial temperature - 70°C Program rate 1 - 15°C/min to 210° Program 1 hold time - 10 min Program rate 2 - 2°C/min to 280°C Final temperature hold time - 11 min
Detector temperature:	330°C

Analytical Techniques for Polynuclear Aromatic Hydrocarbon Compounds (PAHs) in Flesh

A 20 gram tissue sample was dried with sodium sulfate, spiked with deuterated PAH compounds and extracted with dichloromethane. Sample extracts were cleaned up using gel permeation chromatography followed by alumina and silica gel chromatography.

Sample extracts were analyzed using a Varian Saturn II Ion Trap GC-MS. One microliter of sample extract was injected into a J&W Scientific DB-5MS, 30 meter x 0.25 mm I.D. fused silica capillary column having a 0.25 um film thickness. The GC oven temperature was initially held at 70°C for two minutes.

The temperature ramp was 15°C per minute until the oven reached 150°C. The second temperature ramp was 2°C per minute to a final temperature of 280°C and held for 5 minutes. Initial injector temperature was 70° and was programmed to 280° at 300°/min immediately after injection. The GC carrier gas was helium at a linear velocity of 37 cm/sec. Detection limits of the PAHs are reported in Table S-9.

Procedure for Lipid Determination

As synthetic organic concentrations in organisms may vary with lipid content, it is customary to provide lipid data when reporting tissue concentrations. A thoroughly homogenized sample weighing approximately 5 g (wet weight) is macerated and dried with anhydrous granular Na₂SO₄. The dried sample is transferred to a blender with 150 ml of petroleum ether and blended for two minutes at high speed. The liquid is vacuum-filtered into a 250 ml filter flask through a 10 cm Buchner funnel containing Whatman #1 filter paper. The sample is blended once more with an additional 150 ml of petroleum ether and filtered. The filtrate is concentrated to approximately 25 ml with heat (steam bath) and nitrogen steam. The remaining filtrate is then quantitatively transferred into a 50 ml pre-weighed planchet. The petroleum ether is evaporated, the planchet containing the residue is reweighed, and the percent lipid is calculated.

TABLE S-1
 Toxic Substances Monitoring Program
 1994-95 Digestion Techniques and Detection Limits in Fish Tissue

Element	Detection Limits Digestion Techniques	Instrumental Analysis	(ug/g wet weight)
Arsenic	Dry Ash w/Mg(NO ₃) ₂ ·6H ₂ O	NaBH ₄ Reduction A.A.	0.05
Mercury	HNO ₃ reflux	Cold Vapor A.A.	0.02
Copper	HNO ₃ reflux	Flame A.A. or Graphite Furnace	0.02
Zinc	HNO ₃ reflux	Flame A.A.	0.05
Cadmium	HNO ₃ reflux	Graphite Furnace (Ammonium phosphate/magnesium nitrate)	0.01
Chromium	HNO ₃ reflux	Graphite Furnace	0.02
Lead	HNO ₃ reflux	Graphite Furnace (Ammonium phosphate/magnesium nitrate)	0.1
Nickel	HNO ₃ reflux	Graphite Furnace	0.1
Selenium	Dry Ash w/Mg(NO ₃) ₂ ·6H ₂ O	NaBH ₄ Reduction A.A.	0.05
Silver	HNO ₃ reflux	Graphite Furnace	0.02

TABLE S-2
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1994 Trace Metal Quality Control
 (ug/g wet weight)

Station Number	Station Name	Species Code*	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
204.10.00	San Francisco Bay	PHG	O	0.42					<0.02		0.88		
204.10.00	San Francisco Bay	PHG	O	0.43					<0.02		0.88		
603.20.36	Pleasant Valley Reservoir	BN	L			<0.02	210	<0.1				0.82	26
603.20.36	Pleasant Valley Reservoir	BN	L			<0.02	200	<0.1				0.83	26
603.20.36	Pleasant Valley Reservoir	BN	F	0.06	<0.01				0.34	<0.1	0.32		
603.20.36	Pleasant Valley Reservoir	BN	F	0.05	<0.01				0.34	<0.1	0.30		
628.20.13	Mojave River	AC	W	0.12					0.07		0.16		
628.20.13	Mojave River	AC	W	0.11					0.06		0.17		
114.22.90	Santa Rosa Cr/Willowside Rd.	SKR	F	0.06	<0.01				0.13	<0.1	0.16		
114.22.90	Santa Rosa Cr/Willowside Rd.	SKR	F	0.05	<0.01				0.14	<0.1	0.16		
723.10.01	Alamo River/Calipatria	CCF	F		<0.01					<0.1			
723.10.01	Alamo River/Calipatria	CCF	F		<0.01					<0.1			
544.00.90	San Joaquin River/Mosssdale	CP	F								0.81		
544.00.90	San Joaquin River/Mosssdale	CP	F								0.84		
114.11.23	Russian River/Wohler Bridge	SKR	W		<0.01	0.74	0.73	<0.1		1.0		<0.02	19
114.11.23	Russian River/Wohler Bridge	SKR	W		0.01	0.90	0.67	<0.1		1.0		<0.02	18
801.26.03	Anza Channel	FHM	W	0.14	0.02	0.12	1.6	<0.1	0.02	<0.1	0.53	<0.02	35
801.26.03	Anza Channel	FHM	W	0.14	0.02	0.14	1.6	<0.1	0.02	<0.1	0.55	<0.02	34
801.71.12	Big Bear Lake/Rathbone Creek	LMB	F	<0.05	<0.01				0.21	<0.1	0.12		
801.71.12	Big Bear Lake/Rathbone Creek	LMB	F	<0.05	<0.01				0.20	<0.1	0.10		
801.11.07	San Diego Creek/Michelson Drive	PRS	W	0.08	0.07	<0.02	1.1	<0.1	0.03	<0.1	1.6	<0.02	49
801.11.07	San Diego Creek/Michelson Drive	PRS	W	0.07	0.08	0.02	1.1	<0.1	0.03	<0.1	1.6	<0.02	51
801.25.00	Santa Ana River/Prado Dam	BB	L			<0.02	3.6	<0.1				<0.02	17
801.25.00	Santa Ana River/Prado Dam	BB	L			<0.02	3.8	<0.1				<0.02	17

* Tables 3, 4, and 5 list code names for species.

L = Liver.

F = Filet.

W = Whole Body.

TABLE S-2
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1994 Trace Metal Quality Control
 (ug/g wet weight)

Station Number	Station Name	Species Code*	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
904.61.00	San Elijo Lagoon/Central Basin	CKF	W	0.30	<0.01	0.05	1.3	<0.1	<0.02	<0.1	0.33	<0.02	23
904.61.00	San Elijo Lagoon/Central Basin	CKF	W	0.31	<0.01	0.05	1.3	<0.1	<0.02	<0.1	0.35	<0.02	24
904.21.02	Buena Vista Lagoon	LMB	F	0.08	<0.01				0.07	<0.1	0.40		
904.21.02	Buena Vista Lagoon	LMB	F	0.11	<0.01				0.07	<0.1	0.40		
801.25.00	Santa Ana River/Prado Dam	BH	F	<0.05	<0.01				0.15	<0.1	0.14		
801.25.00	Santa Ana River/Prado Dam	BH	F	<0.05	<0.01				0.16	<0.1	0.15		
728.00.90	Salton Sea/South	TLZ	F								2.9		
728.00.90	Salton Sea/South	TLZ	F								3.0		
632.20.00	Indian Creek Reservoir	RBT	L			<0.02	150	<0.1				1.1	28
632.20.00	Indian Creek Reservoir	RBT	L			<0.02	150	<0.1				1.0	28
632.20.00	Indian Creek Reservoir	RBT	F	<0.05							0.10		
632.20.00	Indian Creek Reservoir	RBT	F	<0.05							0.11		
603.30.05	Haiwee Reservoir	LMB	F	0.09					0.07		0.31		
603.30.05	Haiwee Reservoir	LMB	F	0.11					0.06		0.31		
603.10.16	Mammoth Creek/d/s Murphy's Gulch	BN	L			<0.02	41	<0.1				2.2	23
603.10.16	Mammoth Creek/d/s Murphy's Gulch	BN	L			<0.02	42	<0.1				2.2	23
603.10.16	Mammoth Creek/d/s Murphy's Gulch	BN	F	0.55							0.44		
603.10.16	Mammoth Creek/d/s Murphy's Gulch	BN	F	0.54							0.44		

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TABLE S-2
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1994 Trace Metal Quality Control
 (ug/g wet weight)

Station Number	Station Name	Species Code*	Tissue	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc
544.00.16	Old River	RSF	F								0.37		
544.00.16	Old River	RSF	F								0.37		
405.13.91	Marina del Rey/Basin D	RSR	L			0.08	5.8	0.13				0.19	16
405.13.91	Marina del Rey/Basin D	RSR	L			0.08	6.2	0.14				0.18	17
205.50.06	San Fransquito Creek	SKR	W				1.1						
205.50.06	San Fransquito Creek	SKR	W				1.0						

* Tables 3, 4, and 5 list code names for species.

L = Liver.

F = Filet.

W = Whole Body.

TABLE S-3
 Toxic Substances Monitoring Program
 1994-95 Trace Metal Analysis of Reference Materials (ug/g dry weight)*

REFERENCE MATERIAL**	AG	AS	CD	CR	CU	HG	NI	PB	SE	ZN
NBS-1577a (Bovine Liver)		0.059±0.022 (0.047±0.006)							0.71±0.05 (0.71±0.07)	
DOLT-1 (Dogfish Liver)		11.1±1.4 (10.1±1.4)	4.33±0.41 (4.18±0.28)	0.43±0.11 (0.40±0.07)	19.8±1.2 (20.8±1.2)	0.277±0.08 (0.225±0.04)	0.28±0.19 (0.26±0.06)	1.32±0.72 (1.36±0.29)	6.39±0.41 (7.34±0.42)	91.9±11 (92.5±2.3)
DOLT-2 (Dogfish Liver)		14.6±0.31 (16.6±1.1)	19.6±1.2 (20.8±0.5)	0.43±0.14 (0.37±0.08)	27.2±1.3 (25.8±1.1)	2.05±0.07 (1.99±0.10)	0.21±0.04 (0.20±0.02)	0.26±0.08 (0.22±0.02)	5.40±0.16 (6.06±0.49)	87.1±2.5 (85.5±2.5)
DORM-1 (Dogfish Muscle)		17.2±1.8 (17.7±2.1)	0.093±0.017 (0.086±0.012)	3.72±0.49 (3.60±0.40)	4.98±0.62 (5.22±0.33)	0.746±0.10 (0.798±0.07)	1.20±0.17 (1.20±0.30)	0.42±0.14 (0.40±0.12)	1.52±0.10 (1.62±0.12)	18.9±2.3 (21.3±1.0)
NBS-1566a (Oyster)	1.54±0.12 (1.63±0.15)	13.1±0.67 (14.0±1.2)	4.16±0.33 (4.15±0.38)	1.22±0.35 (1.43±0.46)	64.4±2.8 (66.3±4.3)		2.34±0.60 (2.25±0.44)	0.359±0.067 (0.371±0.014)		840±40 (830±57)

* Sample values are given first, followed by reference values in parentheses, both values include 95% confidence interval.

** NBS refers to the National Bureau of Standards; DOLT-1, DOLT-2, and DORM-1 are from the National Research Council of Canada.

TABLE S-4
 Toxic Substances Monitoring Program
 Distribution of Synthetic Organic Compounds Among
 Four Fractions of a Standard Florisil^R Column

(0%) Fraction 1	(6%) Fraction 2	(15%) Fraction 3
HCH, alpha*	HCH, alpha*	dacthal
aldrin	HCH, beta	diazinon
chlordene, alpha	HCH, gamma	dichlorobenzophenone, p,p'
chlordene, gamma	HCH, delta	dieldrin
DDE, o,p'	cis-chlordane	endosulfan I
DDE, p,p'	oxychlordane	endrin
DDMU, p,p'*	trans-chlordane	malathion
DDT, o,p'	chlorpyrifos	oxadiazon
DDT, p,p'*	DDD, o,p'	parathion, ethyl
heptachlor	DDD, p,p'	parathion, methyl
hexachlorobenzene	DDMU p,p'*	tetradifon (tedion)
trans-nonachlor	DDT, p,p'*	
PCB 1248	dicofol (kelthane)	
PCB 1254	ethion	
PCB 1260	heptachlor epoxide	
methoxychlor	<u>(50%) Fraction 4</u>	
cis-nonachlor		
toxaphene	endosulfan II	
endosulfan sulfate		

* Found in both 0% and 6% fractions.

TABLE S-5
 Toxic Substances Monitoring Program
 Synthetic Organic Compounds Analyzed
 and Their Detection Limits in Flesh

Compound (ng/g, ppb wet weight)	Detection Limit
aldrin	5
cis-chlordane	5
trans-chlordane	5
chlordene, alpha	5
chlordene, gamma	5
chlorpyrifos	10
dacthal	5
DDD, o,p	10
DDD, p,p'	10
DDE, o,p'	10
DDE, p,p'	5
DDMS, p,p'	30
DDMU,p,p'	15
DDT, o,p'	10
DDT, p,p'	10
diazinon	50
dichlorobenzophenone-p,p'	30
dicofol (Kelthane)	100
dieldrin	5
endosulfan I	5
endosulfan II	70
endosulfan sulfate	85
endrin	15
ethion	20
HCH, alpha	2
HCH, beta	10
HCH, gamma	2
HCH, delta	5
heptachlor	5
heptachlor epoxide	5
HCB	2
methoxychlor	15
cis-nonachlor	5
trans-nonachlor	5
oxadiazon	5
oxychlordane	5
parathion, ethyl	10
parathion, methyl	10
PCB 1248	50
PCB 1254	50
PCB 1260	50
pentachlorophenol*	2
2,3,5,6-tetrachlorophenol*	2
tetradifon (Tedion)	10
toxaphene	100

* Analyzed only when requested.

TABLE S-6
 Toxic Substances Monitoring Program
 Results of Matrix Spike Analyses: 1994-95 Organic Chemicals in Fish Tissue

Compound	1994 Percent Recovery	1995 Percent Recovery	1995 Percent Recovery (duplicate)
aldrin	67	59	70
cis-chlordane	92	73	95
trans-chlordane	81	72	94
chlordene, alpha	69	62	71
chlordene, gamma	65	62	63
chlorpyrifos	58	55	68
dacthal	99	100	110
DDD, o,p'	94	83	99
DDD, p,p'	100	82	96
DDE, o,p'	69	71	62
DDE, p,p'	83	68	71
DDMU,p,p'	80	63	76
DDT, o,p'	65	55	46
DDT, p,p'	98	82	95
diazinon	96	84	96
dichlorobenzophenone-p,p'	na	96	110
dicofol (Kelthane)	na	48	51
dieldrin	110	100	110
endosulfan I	99	96	100
endosulfan II	110	120	120
endosulfan sulfate	110	120	120
endrin	120	100	120
ethion	49	37	46
HCH, alpha	64	63	74
HCH, beta	64	61	81
HCH, gamma	67	64	81
HCH, delta	46	65	80
heptachlor	50	38	42
heptachlor epoxide	70	74	94
HCB	66	50	50
methoxychlor	100	92	100
cis-nonachlor	100	82	98
trans-nonachlor	94	74	81
oxadiazon	62	100	110
oxychlordane	64	68	92
parathion, ethyl	88	82	95
parathion, methyl	73	59	67
tetradifon (Tedion)	110	100	120

na = Not analyzed.

TABLE S-7
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1994 Synthetic Organic Compounds Quality Control
 (ng/g wet weight)

Station Name	San Diego Creek/ Michelson Drive 801.11.07 PRS		Anza Channel 801.26.03 FHM		Trabuco Creek/Oso Road 901.20.04 PRS		Santa Rosa Creek/ Willowside 114.22.90 SKR	
Station No.	1	2	1	2	1	2	1	2
Species*								
REPLICATE								
<u>COMPOUNDS</u>								
cis-chlordane	5.8	6.0	8.8	8.8				
cis-nonachlor	6.1	5.0	6.6	6.6				
gamma-chlordene								
oxychlordane								
trans-chlordane	5.6	<5.0	8.3	8.5				
trans-nonachlor	14.	11.	20.	18.				
chlorpyrifos								
dacthal	6.9	6.7						
DDD, o,p'			12.	11.				
DDD, p,p'	44.	43.	36.	34.				
DDE, o,p'								
DDE, p,p' 350.	320.	410.	360.	16.	16.			
DDT, o,p' 11.	10.							
DDT, p,p' 16.	14.							
DDMU,p,p'								
diazinon 440.	420.							
dieldrin <5.0	7.6	12.	12.					
endosulfan I								
endosulfan II								
endosulfan sulfate								
hexachlorobenzene								
alpha-HCH								
gamma-HCH								
heptachlor epoxide								
oxadiazon	70.	65.	91.	98.	30.	31.	5.0	6.1
PCB 1248								
PCB 1254			150.	140.				
PCB 1260			73.	70.				
toxaphene	120.	110.						
percent moisture	74.4	74.6	76.4	76.7	74.5	74.5	80.7	80.4
percent lipid	5.30	5.29	4.64	4.77	5.20	5.20	0.390	0.398

* Tables 3, 4, and 5 list code names for species.
 < Below detection limit.

TABLE S-7 (continued)
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1994 Synthetic Organic Compounds Quality Control
 (ng/g wet weight)

Station Name	San Francisco Bay	
Station No.	204.10.00	
Species* PHG		
REPLICATE	1	2
<u>COMPOUNDS</u>		
aldrin		
cis-chlordane		
cis-nonachlor		
gamma-chlordene		
oxychlordane		
trans-chlordane		
trans-nonachlor		
chlorpyrifos		
dacthal		
DDD, o,p'		
DDD, p,p'		
DDE, o,p'		
DDE, p,p' 8.8	8.5	
DDT, o,p'		
DDT, p,p'		
DDMU,p,p'		
diazinon		
dieldrin		
endosulfan I		
endosulfan II		
endosulfan sulfate		
hexachlorobenzene	3.9	3.1
alpha-HCH		
gamma-HCH		
heptachlor epoxide		
oxadiazon		
PCB 1254		
PCB 1260		
toxaphene		
percent moisture	76.3	76.3
percent lipid	2.38	2.11

* Tables 3, 4, and 5 list code names for species.
 < Below detection limit.

TABLE S-7 (continued)
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1995 Synthetic Organic Compounds Quality Control
 (ng/g wet weight)

Station Name	New River/ Westmorland 723.10.02 CCF		Santa Ana River/ Prado Dam 801.25.00 BLB		Buena Vista Lagoon 904.21.02 LMB				San Elijo Lagoon/ Central Basin 904.61.00 CKF	
Station No. Species* REPLICATE	1	2	1	2	1	2	1	2	1	2
<u>COMPOUNDS</u>										
aldrin										
cis-chlordane										
cis-nonachlor										
gamma-chlordene										
oxychlordane										
trans-chlordane										
trans-nonachlor		5.3		5.4						
chlorpyrifos		78.		80.						
dacthal 430.		410.								
DDD, o,p'										
DDD, p,p'		18.		16.	58.	48.				
DDE, o,p'										
DDE, p,p'		330.		310.	24.	27.	91.	76.		
DDT, o,p'										
DDT, p,p'										
DDMU,p,p'		22.		17.						
diazinon										
dieldrin 8.3		7.9								
endosulfan I		5.6		<5.0						
endosulfan II										
endosulfan sulfate										
hexachlorobenzene										
alpha-HCH										
gamma-HCH		2.4		<2.0						
heptachlor epoxide										
oxadiazon		<5.0		6.4						
PCB 1248										
PCB 1254										
PCB 1260										
toxaphene		190.		190.						
percent moisture		80.3		80.7	79.7	79.7	78.7	79.7	77.0	77.2
percent lipid		0.730		0.757	1.68	1.78	0.05	0.056	1.49	1.49

* Tables 3, 4, and 5 list code names for species.
 < Below detection limit.

TABLE S-7 (continued)
 Toxic Substances Monitoring Program
 Results of Duplicate Sample Analysis: 1995 Synthetic Organic Compounds Quality Control
 (ng/g wet weight)

Station Name	Los Penasquitos Creek/u/s Highway I-805		Los Penasquitos Creek	
Station No.	906.10.10		906.10.10	
Species*	LMB		LMB	
REPLICATE	1	2	1	2
<u>COMPOUNDS</u>				
cis-chlordane				
cis-nonachlor				
gamma-chlordene				
oxychlordane				
trans-chlordane				
trans-nonachlor				
chlorpyrifos				
dacthal				
DDD, o,p'				
DDD, p,p'				
DDE, o,p'				
DDE, p,p'				
DDT, o,p'				
DDT, p,p'				
DDMU,p,p'				
diazinon				
dieldrin				
endosulfan I				
endosulfan II				
endosulfan sulfate				
hexachlorobenzene				
alpha-HCH				
gamma-HCH				
heptachlor epoxide				
hexachlorobenzene				
oxadiazon				
PCB 1248				
PCB 1254				
PCB 1260				
toxaphene				
percent moisture	78.6	78.5	78.3	78.6
percent lipid	0.240	0.157	0.296	0.133

* Tables 3, 4, and 5 list code names for species.
 < Below detection limit.

TABLE S-8
 Toxic Substances Monitoring Program
 Sediment Detection Limits: 1994 Synthetic Organic Compounds

Compound (ng/g, ppb dry weight)	Detection Limit
aldrin	0.70
cis-chlordane	1.2
cis-nonachlor	1.8
gamma-chlordene	0.81
oxychlordane	1.1
trans-chlordane	1.1
trans-nonachlor	0.70
chlorpyrifos	3.1
dacthal	1.5
DDD, o,p'	3.0
DDD, p,p'	3.1
DDE, o,p'	1.4
DDE, p,p'	1.4
DDT, o,p'	1.5
DDT, p,p'	1.8
DDMU,p,p'	2.7
diazinon	6.2
dieldrin	0.31
endosulfan I	0.27
endosulfan II	0.29
endosulfan sulfate	0.51
ethion	7.6
hexachlorobenzene	0.43
alpha-HCH	0.57
beta-HCH	1.8
gamma-HCH	0.84
heptachlor	0.66
heptachlor epoxide	1.2
oxadiazon	0.55
PCB 1248	14.0
PCB 1254	14.0
PCB 1260	14.0
toxaphene	70.0
percent moisture	43.6

TABLE S-9
 Toxic Substances Monitoring Program
 Polynuclear Aromatic Hydrocarbons (PAHs) Analyzed
 and Their Detection Limits in Flesh

Compound	Detection Limit (ng/g, ppb wet weight) 1991
naphthalene	100
1-methylnaphthalene	100
2-methylnaphthalene	100
biphenyl	100
2,6-dimethylnaphthalene	100
acenaphthylene	100
acenaphthene	100
2,3,5-trimethylnaphthalene	100
fluorene	100
phenanthrene	100
anthracene	100
1-methylphenanthrene	100
fluoranthene	100
pyrene	100
benz[a]anthracene	100
chrysene	100
benzo[b]fluoranthene	100
benzo[k]fluoranthene	100
benzo[e]pyrene	100
benzo[a]pyrene	100
perylene	100
indeno[1,2,3-cd]pyrene	100
dibenz[a,h]anthracene	100
benzo[ghi]perylene	100